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The Title Page

Why are first year accounting studies inclusive?

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Why are first year accounting studies inclusive?

Abstract

This paper is motivated by the increasing diversity among first year accounting students and the increasing number of first year accounting students whose majors are not in accounting related areas in UK universities. The main contribution of this paper is that it uses student data over four consecutive academic years from a first year accounting course at a UK university to provide empirical evidence in support of the theoretical framework proposed by Rankin, Silvester, Vallely and Wyatt (2003). Our results show the effects of metacognitive knowledge and content knowledge on academic performance as well as highlighting the inclusiveness of the first year accounting course. For instance, regardless of the choices of secondary subjects, students who have good prior academic achievement are the best performers on the first year accounting course. The influence of content knowledge on academic performance is strongly felt when the assessments of the course changed from a 100 percent final exam to a combination of mid-term coursework and a final exam. The results suggest that well-designed mid-term coursework is academically beneficial to accounting students, especially non-native English speaking students.

1. Introduction

This paper is motivated by increasing diversity among students enrolled for first year introduction to accounting courses in UK universities. The fast growing number of non-native speakers and non-accounting major students on first year accounting courses makes it necessary for academics to re-examine the determinants of their accounting academic performance. Prior studies which mainly focus on the academic performance of first year accounting students in one university in a single academic year yield inconsistent and inconclusive results. Rankin et al. (2003) develop a theoretical framework drawn from educational literature to explain much of the variation in the findings of extant literature. The major contribution of this paper is to use four-year consecutive data on first year accounting students in the same university to reveal the variation in the determinants of academic performance which supports the theoretical framework proposed by Rankin et al. (2003). Moreover, to the best of our knowledge, the current paper is the first to detect and examine the significant impact of mid-term coursework on the academic performance of first year accounting students.

The UK government's Higher Education policy over the past decade has encouraged the expansion of the UK higher education sector. In particular, the widening participation programme sponsored by the Department of Innovation, Universities and Skills and the Higher Education Funding Council for England has increased overall participation in higher education, especially students from formerly under-represented groups[2] (HC226 (2009)). The introduction of tuition fees in UK universities in 1985 combined with the introduction of the post-study work visa, and globalisation of education services have further diversified the UK

[2] White ethnic men from lower socio-economic backgrounds and young people living in deprived areas compared with the general population (HC226 (2009)).

universities' student population. From the latest statistics compiled by HESA (Higher Education Statistics Agency) in 2011 (HESA (2011)), non-UK full-time undergraduate students (EU and Non-EU) in UK universities accounted for an average of 12.12 percent for the period between 2006/07 and 2009/10[3]. The average percentage of non-UK full-time accounting major students in UK universities at all levels (undergraduate and postgraduate) between 2006/07 and 2008/09 was 23.83[4]. The high concentration of foreign students on accounting courses, especially first year introduction to accounting courses, is obvious in UK universities. For example, less than 18 percent of students enrolled for the first year *Introduction to Accounting* course between academic year 2006/07 and 2009/10 in the University of Bath have an accounting major while English is not the first language for more than 38 percent of students.

Prior studies using diverse student data from the USA, Hong Kong, Singapore, New Zealand and Australia have inspired us to use UK student data to shed light on the determinants of first year accounting studies. We extend prior literature by using consecutive four-year student data to reveal that some determinants of academic performance can vary from one academic year to the next as suggested by the theoretical framework. Our results show that the diversity indicators among first year students such as motivation, prior educational qualifications and language do not consistently and significantly influence academic performance. It is clear that the first year accounting courses are inclusive and accommodate diversity very well. In addition, students (especially non-native English speakers) seem to

[3] The percentages of non-UK full-time undergraduate students in 2006/07, 2007/08, 2008/09 and 2009/10 are respectively 11.34, 11.80, 12.36 and 12.97.

[4] HESA changed reporting of students by subjects in 2009/10. Therefore, the information about the number of students on accounting majors is no longer reported in statistics since 2009/10. Before 2009/10, HESA did not report the number of students on accounting majors separately at the different levels of study. The percentages of non-UK full-time students majoring in accounting at all levels (postgraduates and undergraduates) in 2006/07, 2007/08 and 2008/09 are respectively 23.48, 23.26 and 24.77 (HESA (2011)).

benefit academically from the change of assessments from only one final exam to the combination of mid-term coursework and a final exam. This evidence provides further support for the theoretical framework by showing the effects of content knowledge on academic performance. This study helps to identify significant determinants of a diversified group of first year accounting students which should aid universities' efforts to meet student needs in learning.

The paper is organised as follows. Section 2 presents the hypotheses derived from a theoretical framework and the literature in the context of passing probabilities and effect on result/grade. Section 3 outlines data sources and measures of variables. In Section 4, we test the hypotheses using multivariate regression and binary analyses. Finally, Section 5 concludes.

2. Literature review and hypotheses

There is scarce research investigating the direct impact of the diversity of the student population on performance in first year introductory accounting courses in UK universities. Internationally, a large body of research has been conducted to understand the relationship between secondary education knowledge in mathematics and accounting and students' first year academic performance on introductory accounting courses, and the implications of diversity on students' first year accounting performance. Even though prior results are inconclusive, most studies find that secondary accounting, secondary mathematics, university entrance score or motivation have a positive impact on students enrolled on introductory accounting courses.

In 2003, Rankin et al. developed a theoretical framework to provide explanations for conflicting prior empirical results. As they note, prior studies mainly focus on the determinants of academic performance of school leavers, but do not consider the diversity of the first year accounting student population. Within the theoretical framework, the diversity of the first year accounting students has been considered while the relationships between academic performance of the first year accounting students and content knowledge[5] and metacognitive knowledge[6] (Winne (1995)) have been well explored and analysed in the context of various educational theories and papers. Based on the theoretical framework and prior studies, we propose the following hypotheses.

2.1. Secondary accounting and business studies-content knowledge

The theoretical framework classifies high school accounting knowledge as content knowledge and suggests that high school accounting will only be beneficial when it provides domain-specific knowledge[7]. American, Australian, Singaporean, New Zealand and UK studies (Swanson and Brooks (1984), Mitchell (1985), Mitchell (1988), Tan, Chan and Tan (1988), Keef and Hooper (1991) and Rankin et al. (2003) and Alcock, Cockcroft and Finn (2008)) document a positive effect of successfully studying secondary accounting and subsequent academic performance in introductory accounting courses. *Introduction to Accounting* at the University of Bath predominantly consists of financial accounting material while the contents of UK GCE A-Level[8] (thereafter A-Level) business studies and accounting have similar emphasis on financial accounting. We expect to see strong academic

[5] Content Knowledge, defined by (Winne (1995)) in Rankin et al. (2003), is information that comprises academic subject matter-facts, principles, and rules, frameworks and schemata, and basic skills.
[6] Metacognitive knowledge is information about self-preferences and attitudes (affected by the student's background and experiences), strengths and weakness, motivation and feelings; as well as information about tasks, how they are structured and how they unfold; and information about goals the student holds and plans for reaching these goals (Winne (1995) in Rankin et al. (2003)).
[7] For detailed information, please see Rankin et al. (2003) (p367-368).
[8] Please see Appendix for detailed information.

performance in *Introduction to Accounting* among students who completed secondary accounting and/or business studies.

H_1: The likelihood of passing Introduction to Accounting or obtaining a high grade (result) in Introduction to Accounting is positively related to student completion of secondary accounting or business studies.

2.2. Secondary mathematics-metacognitive knowledge

Secondary mathematical skills have long been cited as a predictor for successful academic performance in introductory accounting courses, business courses, management studies and various science disciples in countries such as the USA, Australia, Hong Kong and South Africa (Baldwin and Howe (1982), Eskew and Faley (1988), Farley and Ramsay (1988), Auyeung and Sands (1993), Wong and Chia (1996), Beaubouef (2002), Ballard and Johnson (2004), Parker (2006) and Alcock et al. (2008)). We classify secondary mathematical knowledge as metacognitive knowledge since secondary mathematical knowledge forms a part of the cognitive abilities which will influence students' methods of learning. Therefore, we expect a positive effect of secondary mathematics on students' performance and passing in *Introduction to Accounting*.

H_2: The likelihood of passing Introduction to Accounting or obtaining a high grade (result) in Introduction to Accounting is positively related to student completion of basic secondary mathematics.

2.3. Academic ability-metacognitive knowledge

In the theoretical framework, academic ability is a part of metacognitive knowledge which reflects a student's cognitive abilities, motivations, personality and cognitive style (Snow (1989)). The US, Australian and Singaporean studies show that students with high university

entrance scores tend to demonstrate better academic performance in accounting and business courses (Eckel and Johnson (1983), Dockweiler and Willis (1984), Clark and Sweeney (1985), Schroeder (1986), Eskew and Faley (1988), Farley and Ramsay (1988), Doran, Bouillon and Smith (1991), Christopher and Debreceny (1993a), Rohde and Kavanagh (1996), Koh and Koh (1999), Rankin et al. (2003) and Alcock et al. (2008)). The reports by the National Audit Office (NAO (2002) and NAO (2002a)) and the results of Duff (2004) both reveal that school examinations are good indicators of future academic success in UK universities. Thus, we suggest a positive relationship between prior academic ability and subsequent academic performance in *Introduction to Accounting*.

H_3: The likelihood of passing Introduction to Accounting or obtaining a high grade (result) in Introduction to Accounting is positively related to academic ability.

2.4. Motivation-metacognitive knowledge

Motivation, the desire for learning and interest in any subject or degree programme, is the key to better academic performance. Prior studies find a positive relationship between course preference variables and introductory accounting performance in countries like the USA and Australia (Schroeder (1986), Eskew and Faley (1988), Doran et al. (1991), Christopher and Debreceny (1993a)). Rankin et al. (2003) use accounting major as one indicator for students' motivation. It is reasonable to assume that students who choose accounting as a major in university are more interested in accounting knowledge and have greater desire to pursue a career in the accounting profession. Thus, we believe that students majoring in accounting are more motivated in studying an introductory accounting course than students majoring in other areas and are more likely to achieve better academic performance.

H_4: Students who are enrolled in an accounting major are more likely to pass Introduction to Accounting or achieve a higher grade (result) in Introduction to Accounting than students enrolled on other majors.

2.5. Gender-metacognitive knowledge

It is unclear how gender differences influence methods of learning, a part of metacognitive knowledge in the theoretical framework. Past studies report mixed findings regarding the relationship between students' gender and their academic performance in accounting or economics courses in countries like the USA, the UK and Australia (Lipe (1989), Mutchler, Turner and Williams (1987), Mitchell (1988), Ravenscroft and Buckless (1992), Williams, Waldauer and Duggal (1992), Allgood and Walstad (1999), Ziegert (2000)). Some explanations, such as student-instructor interaction and differences in teaching and assessment, have been provided for inconclusive results. In the UK, school examination results (A-Levels) suggest that females tend to achieve more As in A-Levels than males. Since A-Levels are the clearest indicator of future academic success in UK universities (NAO (2002) and NAO (2002a)), it is reasonable to expect that female students should perform better than male students in introductory accounting study.

H_5: Female students are more likely to pass Introduction to Accounting or achieve a higher grade (result) in Introduction to Accounting than male students.

2.6. Language-metacognitive knowledge

In the theoretical framework, language is a factor representing metacognitive knowledge, though to a lesser extent domain-specific (content) knowledge. Using American data, Eskew and Faley (1988) find that secondary English knowledge has a positive impact on academic performance of first year accounting students, while several other studies show no evidence

of the benefits of secondary English to subsequent academic performance in introductory accounting courses using Australian data (Auyeung and Sands (1993) and Christopher and Debreceny (1993a)). Using Hong Kong university students, Wong and Chia (1996) reveal that a higher degree of proficiency in mathematics is associated with a higher level of performance in a financial accounting course for students who are more competent in English. A recent Australian study by Rankin et al. (2003) finds no significant difference in performance in introductory accounting between domestic (Australian) students and international students as well as between native English speakers and non-native English speakers. No UK studies have investigated the impact of language on academic performance of accounting students. We believe that language can be a barrier to a better academic performance in accounting courses. Thus, we propose the following hypothesis:

H_6: Students who are native English speakers are more likely to pass Introduction to Accounting or achieve a higher grade (result) in Introduction to Accounting than students whose mother tongue is not English.

3. Empirical tests

3.1. Sample selection

First-year undergraduate student data in this paper were collected and compiled by the registry in the University of Bath[9] for the academic years between 2006/07 and 2009/10. The data include each student's university record and personal record provided to the university as part of the student admission procedure. There is diversified information recorded by the registry, such as, students' prior educational qualifications, nationality, gender, major and fees status. All first-year undergraduates studying for the following degree courses: *BSc*

[9] We have received ethical clearance from the University of Bath when using personal student data held on university records for the purpose of this research. Students were identified by a unique but anonymous student number rather than by name.

(hons) Accounting and Finance, BSc (hons) Accounting and Finance with work placement, BSc (hons) Business Administration, BSc (hons) Economics, BSc (hons) Economics with work placement, BSc (hons) Economics and International Development, BSc (hons) Economics and International Development with work placement and *BSc (hons) International Management and Modern Languages (French, Spanish or German)*, must complete *Introduction to Accounting* as a core subject. Students from other degree courses (e.g., Mathematics, Physics, Engineering, Sociology, etc) are free to enrol for *Introduction to Accounting* as an optional module. We exclude these students from the analysis because these students are self selected and have different motivations from students who have to complete *Introduction to Accounting* as a compulsory module.

The final sample includes 1,875 first-year undergraduates who enrolled for the *Introduction to Accounting* course in academic years 2006/07 to 2009/10 inclusive. Table 1 summarises students by major, language group, geographical origin, prior educational qualification, and gender. Nearly 37 percent of first-year students taking *Introduction to Accounting* are majoring in business administration while students majoring in accounting and finance account for just 18 percent. Over 61 percent of first-year students taking *Introduction to Accounting* have citizenship in English speaking countries such as the UK, Australia, New Zealand, Ireland, Canada and the USA. Over 22 percent of students are from South-East and East Asia (China, South Korea, North Korea, Japan, Taiwan, Hong Kong, Macau, India, Pakistan, Mauritius, Bangladesh, Sri Lanka, Thailand, Vietnam, Indonesian, Malaysia and Singapore) while only 1 percent of students are from Africa, Central Asia, the Middle East countries, and South and Central America. European students (Russia, East European countries and other Western European countries where the first language is not English) count for over 6 percent. Despite large numbers of students from non-native English speaking

countries, over 78 percent of students attended A-Level examinations or equivalent foundation courses[10] in the UK. Nearly 8 percent of *Introduction to Accounting* students studied the International Baccalaureate[11] in high school. Due to male domination in degrees such as economics and, accounting and finance, over 54 percent of first-year *Introduction to Accounting* students are male.

Insert Table 1

3.2. Measurement of variables

3.2.1. Dependant variables

Three dependant variables are constructed to facilitate a comparison with prior studies: the final result ranging from zero to 100 (Result); grade points ranging from 1.5 to 7 (Grade) and pass/fail (P/F). The final result in the University of Bath's databases is the combination of a student's achievement for all assessments during a semester. For example, if the student got 80 from the mid-term coursework (25 percent of the final result) and 65 from the final exam (75 percent of the final result), the final result for the student is 68.75 (80 X 25% + 65 X 75%). We then convert the final results to grade points using the following rules: grade 7 is equal to 85 and more; grade 6 is equal to and larger than 75 but smaller than 85; grade 5 is equal to and larger than 65 but smaller than 75; grade 4 is equal to and larger than 50 but smaller than 65; grade 3 is equal to and larger than 40 but smaller than 50; and grade 1.5 is smaller than 40. In the University of Bath, 40 is the pass mark, 60 the merit mark and 70 the distinction mark. Thus, P/F is a dummy variable which is equal to 1 if a student's final result is equal to or more than 40 and zero otherwise.

[10] Please see Appendix for the definition.
[11] Please see Appendix for the definition.

Between 2006/07 and 2009/10, the *Introduction to Accounting* course was taught by the same lecturer in classrooms face to face. The textbook for the course changed in the academic year 2008/09 even though the contents of the course did not change significantly during the sample period. In the academic years 2006/07, 2007/08 and 2008/09, all students were assessed 100 percent on final exam. However, mid-term coursework representing 25 percent of total mark was used in the academic year 2009/10. The change of assessment structure from the academic year 2008/09 to 2009/10 provides us with a unique opportunity to examine the robustness of the theoretical framework. Since accounting subjects traditionally emphasise procedural rules and non-intuitive descriptive information (Rankin et al (2003)), a well-designed mid-term test or coursework (fully integrated with learning outcomes and final exam) would assist students to achieve a better understanding of learning outcomes and improve their overall academic performance. In particular, the mid-term coursework would give non-native English speakers a clear indication of their academic progress during the academic term which can help them to better address any issues ahead of the final exam[12]. The impact of the mid-term coursework on students' final results is examined and analysed in Section 4.2.

3.2.2. Independent variables

Some data items which are required for the examination of the hypotheses are missing from the university databases. For instance, the databases show all prior qualifications the enrolled students have but sometimes without detailed information provided, such as the overall results of prior qualifications and the courses or subjects the student attempted in high school. Due to incomplete information, we cannot construct certain independent variables for some

[12] We are grateful for the suggestions provided by an anonymous referee.

students. These students are still included in the univariate analysis since they provide us with a unique opportunity to understand their academic performance.

Secondary accounting and business studies (Abs): this variable, testing hypothesis 1, is equal to one if a student completed accounting and/or business studies in high school, and zero otherwise. In total, the databases did not record this information for 445 students.

Secondary mathematics (Maths): is for hypothesis 2, equal to one if a student completed basic mathematics in high school and zero otherwise. In total, the databases did not record this information for 435 students.

Academic ability[13]*:* is for hypothesis 3, equal to 1 if a student obtained 3 or more As from any subjects at A-Level, zero otherwise. The University of Bath has recruited many students from the European Union and around the world. When we convert other qualifications into equivalent A-Levels, the following criteria are used. First, foundation courses, Hong Kong A-Level and VCE A-Level are treated as an equal to A-Levels. Any students who passed a foundation course with an overall mark of 80 percent or more or 3 or more As in Hong Kong A-Level and VCE A-Level are considered to have the same level of academic ability as students who got 3 or more As from A-Level. Second, 16 or more points from the French Baccalaureate or 80 percent or more from the European Baccalaureate are equal to 3 As or more at A-Level. Third, 40 or more points including bonus points from the International Baccalaureate are equal to 3 As or more at A-Level. Finally, some students are enrolled using other national qualifications which are not comparable to A-Level or the registry did not

[13] All UK and international school leaver qualifications are detailed in the Appendix.

record their overall marks and individual marks for subjects. In total, this information is missing for 402 students.

Motivation (Major): is for hypothesis 4, equal to 1 if a student is majoring in accounting and finance and zero otherwise. *Gender (Gender):* is for hypothesis 5, equal to 1 if a student is female and zero otherwise. *Language (Lang):* is for hypothesis 6, equal to 1 if a student is a citizen in an English speaking country and zero otherwise. Variable constructions are summarised in Table 2.

Insert Table 2

4. Results

4.1. Summary statistics

Table 3 reports summary statistics of variables. The final results of students are reported by years and on aggregation. The mean (median) result of all first-year *Introduction to Accounting* students over four academic years is 68.15 (71) from a total of 100 points, with results ranging from zero to 100. The average result changes slightly between 2006 and 2009, the highest mean 73.31 in the academic year 2009/10 and the lowest mean 62.36 in the academic year 2008/09. Looking at grade points, it is clear that only 8 percent of the students failed (<40; grade 1.5) while 20.11 percent are in the top category (>=85; grade 7). Twenty four students have zero final result, indicating that they did not obtain any results from any assessments. Close examination reveals that twelve of these students left the university, six students were suspended from the university and six students are still classified as current students. If students did not attend the assessments without any proper explanations, students can be expelled from the university. If these students had good reasons (mitigating circumstances) for missing assessments, the University tends to give them another chance to complete their first year courses in the next academic year.

About 50 percent of students have no prior accounting knowledge (accounting and business studies (Abs)) while data on prior accounting is missing for 23.73 percent of students. Over 52 percent of *Introduction to Accounting* students have prior mathematics knowledge (secondary mathematics (Maths)) while this information is missing for 23.30 percent of students. 42.35 percent of first-year *Introduction to Accounting* students obtained three As or more at A-Level or equivalent educational qualifications. Data on the level of prior academic ability is missing for 21.44 percent of international students. About 80 percent of first-year *Introduction to Accounting* students have a non-accounting major. Overall, there is high variation in prior relevant metacognitive and content knowledge in the sample.

Insert Table 3

4.2. Multivariate results

In this section multivariate analyses are conducted in relation to the hypotheses 1-6 and these results are summarized in Table 4. We exclude students with missing data items from multivariate analyses, partly because the univariate results[14] are quantitatively similar to the multivariate results. It is possible that multivariate results can be compounded by the lack of data items for various subsets of students. However, for students with all data items, researchers can have a better understanding of the determinants of academic performance using multivariate tests.

Insert Table 4

The effect of independent variables on Result and Grade is examined using the ordinary least squares regressions and the results are reported in Table 5. The role of independent variables on the probability of passing *Introduction to Accounting* is tested using binary logistic models and is shown in Table 6. Table 5 reveals the role of each independent variable on a student's academic performance. On aggregation, a male student whose first language is not English

[14] We do not report univariate results here but the results are available from the authors on request.

can expect 56.47 (Grade 4.045) in *Introduction to Accounting*. If this student completed secondary accounting and business studies, his mark increases by 4.445 (Grade 0.370) to 60.92 (Grade 4.415). If this student completed secondary mathematics too, his mark will increase further by 7.557 (Grade 0.615) to 68.48 (Grade 5.03). If he also got 3 As in A-Level or equivalent high school qualifications, his mark will go up again by 7.223 (Grade 0.618) to 75.70 (Grade 5.648). For each sample year, the effects of independent variables are significantly different. Completion of secondary mathematics can add 10.11 points (Grade 0.87) to a student's mark in the academic year 2008/09 but only 4.73 (Grade 0.41) in the academic year 2007/08. Completion of secondary accounting and business studies can enhance a student's result by 8.43 in the academic year 2008/09 but can reduce the student's performance by 0.72 in the academic year 2007/08.

Insert Tables 5 and 6

Table 6 shows the effects of independent variables on passing probabilities. Binary logistic models used in this paper automatically include significant independent variables and exclude insignificant ones. In the academic years 2006/07 and 2007/08, the passing rates are not determined by any of the variables. In the academic years 2008/09 and 2009/10, a higher passing rate is expected among students with high prior academic ability (As) or among students who completed secondary mathematics (Maths), respectively. On aggregation, among students with all data items available, those who completed secondary mathematics and have high prior academic ability have a better chance to pass *Introduction to Accounting* than the rest. It is reasonable that students who completed secondary mathematics and have high prior academic ability have a higher chance to pass the course than other students since these students are more likely to obtain higher results or grades than the rest (see Table 5).

The multivariate results indicate that secondary mathematics and prior academic ability, metacognitive knowledge in the theoretical framework, are the determinants of academic performance. These results are consistent with the theoretical framework and prior American, UK, Hong Kong, Australian and Singaporean studies mentioned in Section 2. As suggested by the theoretical framework, previous inconsistent and inconclusive results regarding the effect of secondary accounting on academic performance of accounting studies can be explained by the lack of close correspondence between secondary accounting and subsequent introductory accounting courses. Our results support the theoretical framework given that content knowledge in the form of secondary accounting and business studies has an inconsistent relationship with academic performance over the four academic years. Secondary accounting and business studies taught in different high schools and colleges may emphasise different aspects of financial accounting in different academic years, so it is possible that these courses' correspondence with introductory accounting courses varied from one year to the next.

Other factors representing metacognitive knowledge such as accounting major has been inconsistently related to student performance over the time period, while there is no performance difference between native English speakers and non-native English speakers. Gender appears to be a good predictor in the regressions. However, this result should be interpreted with caution since the univariate results show no performance difference between males and females and students with missing data are excluded from the regression analysis. We analyse students with at least one missing data item by major, language group, geographical origin, prior educational qualification and gender[15]. We find that over 51 percent of students with missing data are females which accounts for nearly 27 percent of all

[15] The table is not reported there but is available on request.

female students. Since female students account for less than a half of the whole student population (45.87 percent), it is possible that the multivariate results are affected by excluding female students with missing data.

Finally, based on the theoretical framework, we suggest that an addition of mid-term coursework in 2009/10 is beneficial to students, especially non-native English speakers in Section 3.2.1. The independent samples t-tests[16] are used to compare the total result and final result differences of all students between 2008/09 and 2009/10 as well as the total result and final result differences between all non-native English speaking students between 2008/09 and 2009/10. The results suggest that students' total result significantly improves in 2009/10 (10.95, 1% level). Non-native English speakers, on average, obtain above 3 and 2 marks more than native English speakers in 2009/10 in the total results as well as the final results.

5. Conclusion

This paper is motivated by the increasing number of accounting students and the increasing diversity among the accounting student population in the UK higher education sector. We extend the literature in two ways. First, using four consecutive years of student data, we are able to empirically examine the robustness of the theoretical framework without the impact of different entrance requirements, different teaching delivery, different teachers, different learning environment, etc. Second, the unique data gives us an opportunity to reveal the academic benefits of using mid-term coursework in the first year accounting course.

In line with the theoretical framework and prior studies, the effects of metacognitive knowledge on academic performance are very evident in this study: students who completed

[16] The results are not reported here but are available on request.

secondary mathematics and/or have a high prior academic achievement significantly outperform students who did not study or complete secondary mathematics and/or have a lower prior academic achievement. Moreover, the theoretical framework indicates that secondary accounting knowledge might not be beneficial for first year accounting students due to the effects of differences in domain-specific knowledge. The empirical results of this study support the theory since the relationship between secondary accounting and business studies and academic performance of first year accounting students is inconsistent over the sample time period. Furthermore, the effects of domain-specific knowledge are observable when the assessment for the *Introduction to Accounting* course changed from 100 percent final exam to the combination of mid-term coursework and a final exam. In particular, non-native English speaking students see the most improvement in their academic performance.

Finally, there is a limitation to this study. Similar to the Australian study by Rankin et al. (2003), we find a gap in the university databases which failed to record the detailed high school subjects and overall results for some international students. Nearly 24 percent of the total 1,875 students have missing information regarding their high school qualifications. Current data limitations prevent us from fully understanding the determinants of academic performance of international students. However, the question is worthy of further research efforts since internationalisation and tuition fee increases will further diversify the student population in UK universities in the coming years.

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Appendix

Explanation notes of UK and international high school certifications excluding national qualifications which are not comparable to UK A-Levels

UK GCE A-Levels (The General Certificate of Education Advanced Level) is a subject-based qualification mostly taken by UK students aged 16–19. The A-Level is the standard entry qualification for assessing the suitability of applicants for academic courses in UK universities. Students normally study 3 or 4 A-Levels over a 2 year period.

Foundation courses are courses offered by many UK universities and colleges for foreign students whose qualifications are not quite equivalent to A-Levels in order to bring them up to a standard at which they can start the first year of a UK university degree course.

The European Baccalaureat is the school-leaving examination for students who attend one of the 14 so-called European Schools established to educate the children of parents working in European Union institutions. The European Baccalaureate is more broad-based than the UK A-Levels as students are required to study at least 10 subjects over a broad range of disciplines.

The International Baccalaureate is a diploma programme which is an internationally recognised qualification for students aged 16 to 19. It is based around detailed academic study of a wide range of subjects, including languages, the arts, science, mathematics, history and geography. It leads to a single qualification, rather than separate qualifications for individual subjects.

The Hong Kong Advanced Level Examinations is a subject-based qualification taken on leaving high school. Students normally study 4 or 5 subjects and the qualification is the standard entry qualification for Hong Kong universities.

Vocational Certificate of Education A-Level (now withdrawn) is a subject-based vocational qualification made up of modules, each covering different aspects of the subject. Assessment was by a mixture of continuous assessment, based on a portfolio of evidence, and externally set and marked examinations.

The French Baccalaureate is a broad-based diploma required to pursue university studies and taken by students at the end of secondary education.

BTEC ND is a vocational qualification taken in England, Wales and Northern Ireland by people aged 16 and over

GCE A-Level Extension is Advanced Extension Awards were a higher level A-Level examination aimed at the most able students.

GCE AS-Level is Advanced Subsidiary Level - a stand-alone qualification made up of two or three units are assessed at the end of the first year of A-Level study.

Finance CFSP is an examination set by the Institute of Financial Services.

S-Level is GCE Scholarship-Level – a precursor of the A-Level Extension.

Cache practical 7 & 8 is a qualification specifically in child development.

Key Skills Qualification is a frequently required component of 14-19 education in the UK which is generally available in schools alongside other qualifications. It can be taken at levels 1-4.

International qualifications are national qualifications which are not explained in the paper because of diversity and lack of comparison with the UK A-Levels.

Table 1
First Year *Introductory Accounting* student descriptive statistics

	2006/07	2007/08	2008/09	2009/10	Total	Percent
Major of enrolment						
Accounting and finance	82	71	81	102	336	17.92%
Business administration	181	187	161	159	688	36.69%
Economics and related majors	102	113	150	133	498	26.56%
International management and modern language	90	88	84	91	353	18.83%
Primary language						
English (1)	266	290	275	316	1147	61.17%
Non-English	189	169	201	169	728	38.83%
Geographic make-up (2)						
English speaking countries	266	290	275	316	1147	61.17%
South-east and East Asia	125	89	109	93	416	22.19%
European countries	59	77	85	72	293	15.63%
The rest	5	3	7	4	19	1.01%
Prior educational qualification (3)						
UK qualifications	369	359	368	369	1465	78.13%
European qualifications	16	23	35	44	118	6.29%
International Baccalaureate	40	32	29	48	149	7.95%
International qualifications	30	45	44	24	143	7.63%
Gender						
Male	236	245	251	283	1015	54.13%
Female	219	214	225	202	860	45.87%
Total number of students	455	459	476	485	1875	100.00%

(1) and (2) Please see Section 3.2 for detailed information; (3) UK qualifications include GCE A-Level, GCE A-Level Extension, Foundation courses and GCE AS-Level, BTEC ND, Finance CFSP, S-Level, VCE A-Level, Cache practical 7 & 8, Key skills and other UK qualifications. European qualifications include European baccalaureate and French baccalaureate. International qualifications include other national qualifications. Please see Appendix for the definitions of prior educational qualifications.

Table 2
Variable constructions

Variables	Variable construction	Variable name	Hypothesis	Predictive sign
Dependent variables				
The final result	Aggregated result for a student for all assessments of the course	Result		
Pass/fail	1= the final result is 40 or over; 0= less than 40	P/F		
Grade points	The final result is converted into grade: grade 7 >=85%; <85% grade 6 >=75%; <75% grade 5 >=65%; <65% grade 4 >=50%; <50% grade 3 >=40%; grade 1.5 <40%.	Grade		
Independent variables				
Secondary accounting and business studies	1= secondary accounting and /or business studies; 0= no secondary accounting and/or business studies	Abs	1	+
Secondary mathematics	1= secondary mathematics; 0 = no secondary mathematics	Maths	2	+
Academic ability	1= 3 As and more or equivalent; 0= 2 As and less or equivalent	As	3	+
Motivation	1 = accounting major; 0 = other majors	Major	4	+
Gender	1= female; 0= male	Gender	5	+
Language	1 = citizens in English speaking countries; 0 = other	Lang	6	+

This table summarizes variables used in the analyses, details variable constructions, variable names, hypotheses examined and predictive signs of independent variables according to the hypotheses.

Table 3
Descriptive statistics for dependent and independent variables

Variables	No. students	Mean	Medium	Std Dev	Min	Max	Skewness
Continuous variable							
Dependent variables (Result)							
2006/07	455	69.03	72.00	19.09	0.00	100.00	-1.15
2007/08	459	67.83	71.00	16.23	0.00	97.00	-1.30
2008/09	476	62.36	66.00	22.21	0.00	100.00	-0.68
2009/10	485	73.31	77.00	18.26	0.00	100.00	-1.08
Total	1875	68.15	71.00	19.48	0.00	100.00	-1.02
Dummy and Categorical variables							
Dependent variables	Category	No. Students	2006/07	2007/08	2008/09	2009/10	Percentage
Grade	7	377	98	53	77	149	20.11%
	6	441	101	127	93	120	23.52%
	5	380	103	122	75	80	20.27%
	4	390	94	102	102	92	20.80%
	3	137	31	33	64	9	7.31%
	1.5	126	20	17	58	31	6.72%
	1.5 (Zeros)	24	8	5	7	4	1.28%
P/F	0	150	28	22	65	35	8.00%
	1	1725	427	437	411	450	92.00%
Independent variables							
Abs	0	931	209	213	246	263	49.65%
	1	499	147	142	99	111	26.61%
	Missing data	445	99	104	131	111	23.73%
Maths	0	463	139	139	92	93	24.69%
	1	977	217	220	257	283	52.11%

	Missing data	435	99	100	127	109	23.20%
As	0	679	210	151	142	176	36.21%
	1	794	150	207	211	226	42.35%
	Missing data	402	95	101	123	83	21.44%
Major	0	1539	373	388	395	383	82.08%
	1	336	82	71	81	102	17.92%
Gender	0	1015	236	245	251	283	54.13%
	1	860	219	214	225	202	45.87%
Lang	0	728	189	169	201	169	38.83%
	1	1147	266	290	275	316	61.17%

Result = the final result for the course aggregated from all assessments; Grade = the final result for a student is recoded as grade: grade 7 >=85%, grade 6 <85% and <=75%, grade 5 <75% & >=65%, grade 4 <65% & >=50%, grade 3 <50% & >=40%, grade 1.5 <40% including zeros; Abs=1 = students completed secondary accounting and business studies, 0 = students did not study secondary accounting and business studies, missing data= such information is missing for students; Maths = 1 = students completed secondary mathematics, 0 = students did not study secondary maths, missing data = such information is missing for these students; As = 1 = students got 3 As or more from A-Level or equivalent European and international qualifications, 0 = students did not get 3 As or more from A-Level or equivalent European and international qualifications, missing data = such information is missing for these students; Major = 1 = students majoring in accounting and finance, 0 = students with other majors; Gender = 1 = female students, 0 = male students; Lang = 1 = students with citizenship from English speaking countries, 0 = students from non-English speaking countries.

Table 4
Summary table of multivariate results

Variables	Sign	2006/07		2007/08		2008/09		2009/10		Total	
		Performance	Passing	Performance	Passing	Performance	Passing	Performance	Passing	Performance	Passing
Abs	+	+***	X	-	X	+***	X	+**	X	+***	X
Maths	+	+***	X	+***	X	+***	X	+***	+**	+***	+**
As	+	+***	X	+***	X	+***	+**	+***	X	+***	+**
Major	+	-**	X	+**	X	+*	X	-	X	+	X
Gender	+	+**	X	+	X	+**	X	+	X	+**	X
Lang	+	-	X	-	X	+	X	-	X	+	X

This table summarises the relations between dependent variables (Result, Grade, P/F) and independent variables (Abs, Maths, As, Major, Gender and Lang). Sign is based on the hypotheses 1-6 in Section 2. Performance summarizes the LSR results presented in Table 6 while Passing summarizes the Binary Logistic results reported in Table 5. *** represents 1% significant level; ** 5%; * 10%; no * for insignificant level; and X represents the factor is not included into the binary logistic models. Please see Table 2 for the constructions of Result, Grade, P/F, Abs, Maths, As, Major, Gender and Lang. Result=the final result (100); P/F=Pass/Fail; Grade= Grade points from 1.5 to 7; Abs=Secondary accounting and business studies; Maths=Secondary Maths; As=Academic ability; Major=Motivation; Gender=Gender and Lang=Language.

Table 5
The least squares regression results for dependant variables, Result and Grade
Panel A: Result

		N	Intercept	Abs	Maths	As	Major	Gender	Lang	F	Adjusted R2
	2006/07	356	57.734	6.233	7.346	8.029	-6.574	5.001	-0.812	7.643	0.101
P-value			0.000	0.002	0.001	0.000	0.014	0.009	0.718	0.000	
	2007/08	354	61.542	-0.720	4.727	5.783	5.092	1.492	-0.752	4.504	0.056
P-value			0.000	0.685	0.013	0.001	0.036	0.355	0.716	0.000	
	2008/09	344	43.084	8.432	10.113	9.161	5.609	4.616	3.403	7.727	0.105
P-value			0.000	0.001	0.000	0.000	0.096	0.043	0.196	0.000	
	2009/10	374	63.472	4.107	7.983	7.347	-3.443	0.144	-0.770	5.288	0.065
P-value			0.000	0.043	0.000	0.000	0.152	0.938	0.753	0.000	
	Total	1428	56.471	4.445	7.557	7.223	0.287	2.386	0.767	18.894	0.070
P-value			0.000	0.000	0.000	0.000	0.835	0.015	0.523	0.000	

Panel B: Grade

		N	Intercept	Abs	Maths	As	Major	Gender	Lang	F	Adjusted R2
	2006/07	356	4.217	0.502	0.578	0.739	-0.452	0.337	-0.133	8.257	0.109
P-value			0.000	0.001	0.001	0.000	0.034	0.028	0.460	0.000	
	2007/08	354	4.372	-0.019	0.411	0.453	0.550	0.204	-0.061	5.264	0.068
P-value			0.000	0.897	0.011	0.002	0.008	0.135	0.729	0.000	
	2008/09	344	3.013	0.642	0.866	0.747	0.494	0.426	0.144	8.189	0.112
P-value			0.000	0.002	0.000	0.000	0.069	0.021	0.496	0.000	
	2009/10	374	4.543	0.387	0.615	0.649	-0.139	0.033	-0.057	5.307	0.065
P-value			0.000	0.023	0.001	0.000	0.491	0.832	0.782	0.000	
	Total	1428	4.045	0.370	0.615	0.618	0.118	0.216	0.008	20.747	0.077
P-value			0.000	0.000	0.000	0.000	0.295	0.007	0.937	0.000	

Panel A reports the regression results for continuous dependent variable (Result) for all sample years as well as aggregated data, while Panel B shows the regression results for categorical dependant variable (Grade) for all sample years as well as aggregated data. Please see Table 2 for the constructions of Result, Grade, P/F, Abs, Maths, As, Major, Gender and Lang. Result=the final result (100); P/F=Pass/Fail; Grade= Grade points from 1.5 to 7; Abs=Secondary accounting and business studies; Maths=Secondary Maths; As=Academic ability; Major=Motivation; Gender=Gender and Lang=Language.

Table 6
Binary logistic regression results for dummy dependent variable, P/F

		N	Intercept	Abs	Maths	As	Major	Gender	Lang	LRT	Nagelkerke R square
	2006/07	356	2.821								
P-value			0.000								
Exp (B)			16.800								
	2007/08	354	3.190								
P-value			0.000								
Exp (B)			24.286								
	2008/09	344	1.565			0.692				254.781	0.024
P-value			0.000			0.035					
Exp (B)			4.783			1.997					
	2009/10	374	2.234		0.967					151.990	0.032
P-value			0.000		0.038						
Exp (B)			9.333		2.630						
	Total	1428	2.060		0.463	0.535				699.094	0.018
P-value			0.000		0.032	0.012					
Exp (B)			7.849		1.589	1.707					

Summary of binary logistic regression results for dummy dependent variable, P/F, for all sample years as well as aggregated data. When using SPSS, the method for binary logistic models is "Forward: LR". This method clearly shows which variables aside from the intercept are significant and should be included in the analysis. This method will exclude insignificant independent variables from the models. Please see Table 2 for the constructions of Result, Grade, P/F, Abs, Maths, As, Major, Gender and Lang. Result=the final result (100); P/F=Pass/Fail; Grade= Grade points from 1.5 to 7; Abs=Secondary accounting and business studies; Maths=Secondary Maths; As=Academic ability; Major=Motivation; Gender=Gender and Lang=Language. Result=the final result (100); P/F=Pass/Fail; Grade= Grade points from 1.5 to 7; Abs=Secondary accounting and business studies; Maths=Secondary Maths; As=Academic ability; Major=Motivation; Gender=Gender and Lang=Language.